Alternative 20

Source Control and Added Storage

E-009036

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Emphasis

This alternative improves water quality through pollutant source management and provides additional surface water storage.

Distinguishing Features

Physical and Structural Features

Increase capacity of selected reservoirs or build additional reservoirs for supply reliability and environmental releases. Increase downstream channel capacities to reduce reservoir flood control capacity requirements. Construct flow and fish barriers in Delta and tide gates or flow barriers in the southern Delta. Implement a moderate level of Bay-Delta and upstream habitat restoration, channel island restoration and channel and levee improvements to improve system reliability.

Operational and Management Features

Reevaluate current reservoir and flood control operations, to develop more flexible operating criteria using adaptive management. Modify operations at Clifton Court Forebay to reduce the effects of entrainment. Use real-time flow monitoring and adapative management to control upstream reservoir releases, dilute contaminants, and repel salinity intrusion. Time export diversions to increase selected channel flows and export capacities. Manage fisheries, hatchery and release operations, and regulate harvesting. Obtain 100 TAF on San Joaquin River and manage for environmental purposes.

Institutional and Policy Features

Improve pollutant source controls and enforcement for urban and agricultural drainage, remediate on-site mine drainage, and use a watershed management approach to reduce and treat high-priority pollutant sources. Implement programs that address conservation, reclamation, water transfer, conjunctive use, land fallowing, and water pricing.

Benefits

- Improves ecosystem quality
- Improves Delta water supply and quality
- Improves system reliability
- Increases operational flexibility
- Reduces pollutant mass loading and improves timing of discharges

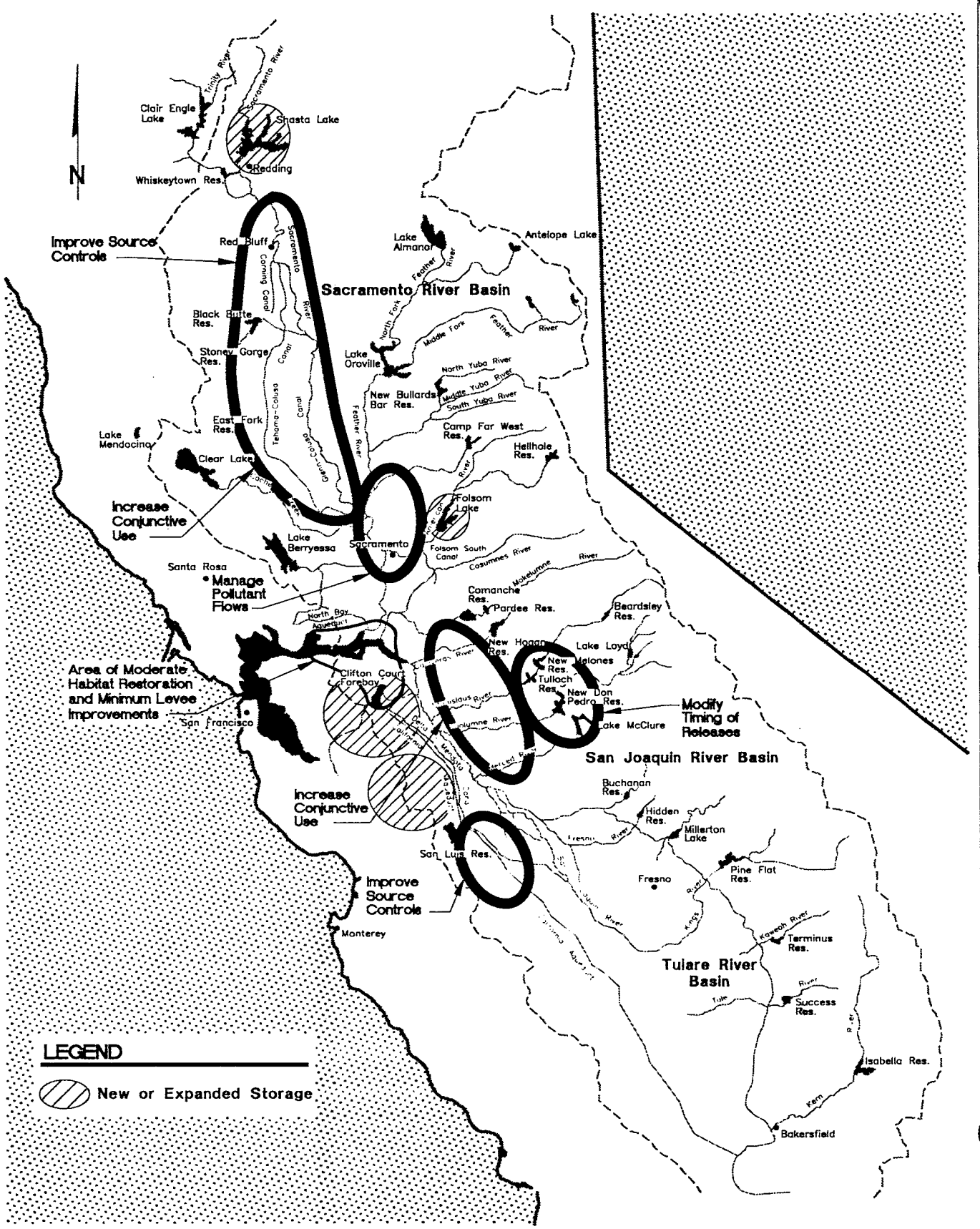
Constraints and Concerns

- Difficulty in enforcement of pollutant-source control regulations
- Mortality in south Delta export facilities remains high
- Some Delta islands remain vulnerable to flooding
- Water supply operations remain constrained by export restrictions
- Delta water supplies remain vulnerable to interruption

PRELIMINARY DRAFT

Source Controls with Added Storage

Alternative 20



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Alternative 20

Source Controls With Added Storage

This alternative provides shared benefits for the ecosystem, water supply, and water quality through a combination of pollutant source controls and management, additional storage, and improved flow and circulation management within the Delta.

Water quality and dependent beneficial uses can be enhanced in the Delta by coordinated actions that address the management of pollutant sources and the management of in-Delta flows and water movement. Management of pollutant sources includes actions directed at source reduction and the elimination and treatment of nonpoint source discharges prior to entering the Delta. Pollutant source controls include implementing source control regulations for agricultural drainage and retiring lands with drainage problems. Treatment controls may include storage and treatment facilities for better management of mine drainage sources. The context for establishing priorities for pollutant source management would be the watershed management approach, whereby priority sources (e.g., mine drainage) would be mitigated through flexible institutional and regulatory arrangements. Pollutant source control is not sufficient to protect resources from adverse water quality impacts unless it is associated with measures to counteract reduced flows and circulation patterns that draw Bay waters into the Delta. In order to better manage this aspect of the water quality problem, increased flows, better management of the timing of flows, and the provision of barriers to better direct these flows are called for in this alternative. Actions that increase upstream storage and provide greater flexibility in the management of that storage are therefore incorporated. This combination of source control, in-Delta flow control, and increased upstream storage also will be managed to improve upstream and in-Delta habitat and water supply reliability. For example, providing pulse flows for fish migration enhancement would be accommodated in this alternative. Water supply reliability should increase as export pumping restrictions are relaxed in response to effectiveness of actions providing water quality, habitat, and fisheries enhancement.

Physical and Structural Features

Increase Capacity of Selected Upstream and Downstream Reservoirs— In order to provide additional storage for in-Delta flow management, raise upstream reservoirs such as Folsom and Shasta and downstream reservoirs in the export service area or

build additional reservoirs. Capacities should be increased so that releases can provide shared benefits to the ecosystem and the water supply during normal conditions while maintaining adequate carryover for critical periods.

Increase Downstream Floodway Capacities— Increase downstream channel capacities by widening channels, building setback levees, expanding existing floodways, and/or constructing new floodways to reduce reservoir flood reserve capacity requirements.

Construct Flow and Fish Barriers— Construct flow and fish barriers to better manage water movement in the Delta, minimize reverse flows and salinity intrusion, and facilitate fish migration into and from the Delta. Potential anadromous fish barrier locations include the Delta Cross Channel, Georgiana Slough, and Threemile Slough. Construct tide gates and/or flow barriers in the southern Delta to better manage south Delta water quality. Operation of the fish barriers will be coordinated with assistance from real time monitoring of anadromous fish population and movement.

Delta Levee Habitat Restoration— Restore approximately 100 levee miles of shallow water, riverine and riparian habitat in the Delta to provide forage and cover habitat for resident and anadromous fish, and to provide other benefits associated with riparian habitat. Actions might include setback levees, creation of berms, creation of shallow water habitat, and increased vegetation on levees in coordination with efforts to improve flood protection. Considerations for site selection will include distance from hazards such as pumping plants, protection from waves generated by wind and boat wakes, importance of island integrity to the maintenance of Delta water quality, and need to improve channel capacity and structural stability of levees. Good candidate areas are Twitchell Island along Three Mile Slough and Seven Mile Slough, Georgiana Slough, and the north and south forks of the Mokelumne River.

Delta Habitat Restoration— Restore shallow water and tidal wetland habitat in the Delta to provide spawning areas, forage areas, and escape cover for juvenile salmon, Delta smelt, splittail, and other species. Candidate areas include Prospect Island, Liberty Island, Little Holland Tract, Hastings Tract, Yolo Bypass, and the southeast Delta. Also restore shallow water shoreline habitat along margins of the lower Sacramento and San Joaquin channels, and tributary sloughs including Georgianna Slough, Barker Slough, Lindsey Slough, and Parker Island. Riparian, wetland, and terrestrial habitat would also be restored on Delta islands and upland areas adjacent to river channels such as Decker Island.

San Joaquin River Habitat Restoration— Restore channel features to improve fish survival. Actions may include restoration of deeper, narrower channel areas to keep water cooler, and isolation of quarry areas to protect young fish from predation and straying.

Bay Habitat Restoration— Restore about 2,000 acres of tidal wetlands between Collinsville and Carquinez Strait. Actions may include conversion of diked wetlands to tidal wetlands or use of dredge spoils to create wetland areas. The resulting habitat types will provide wet year spawning habitat for Delta smelt, rearing areas for salmon, as well as habitat for diverse wildlife including canvasback and redhead ducks.

Fish Screens— Install fish screens on diversions over 250 cfs that are on fish migration routes in the Delta, rivers, and tributaries.

Restore Delta and Upstream Habitat— Restore variety of habitat types (shallow water, riverine, riparian, tidal wetland) upstream of and within the Delta by providing and protecting spawning areas, forage area, and cover habitat.

Restore Channel Islands— Restore and protect channel islands. Evaluate contribution of upstream meander belts to sediment deposition at channel islands. Establish zones for different types of boating use to protect channel islands and adjacent levees from large boat wakes.

Flood Protection Level— This action provides a minimum level of protection to Delta system levees. First, all levees not yet providing a level of protection equivalent to the hazard mitigation plan (HMP) will receive the necessary upgrades to their levees to meet HMP standards. A level of flood protection equivalent to the US Army Corps of Engineers' Public Law (PL)- 99 standard would be provided to: 1) critical western Delta islands (such as Sherman Island), with important regional infrastructure (e.g. the Mokelumne Aqueduct, transmission lines, Highway 160, etc.); and 2) islands with both valuable habitat and infrastructure (such as New Hope Tract, Bouldin Island, Palm Tract, Lower and Upper Jones Tracts, and Lower Roberts Islands).

Channel Improvements and Levee Maintenance— A minimal level of channel improvements (e.g. widening for improved conveyance), levee maintenance and stabilization (e.g. stabilizing berms), the modification of agricultural practices to reduce subsidence potential, setback levees, providing funding for maintenance and stabilization, and maintaining and/or reconstructing levees are indicative of the range of actions that

would be implemented with the intent of reducing the risk of the Delta levee system with respect to its value in providing water supply, water quality, ecosystem quality, and land use/infrastructure benefits.

Operational and Management Features

Control Volume of Agricultural Discharges— Selected agricultural water quality management measures, such as those directed at drainage volume control, can reduce agricultural water demands and increase in-Delta flows.

Reoperate Existing Upstream Reservoirs— Reevaluate reservoir operations, flood control reserve capacity requirements and other operational constraints, and develop more flexible operating criteria using adaptive management. Utilize additional storage as a source of releases for water quality, fisheries, habitat and water supply reliability.

Modify Timing of Releases— Using real time flow monitoring and adaptive management, manage upstream reservoir releases from New Melones, Folsom, and other reservoirs both seasonally and annually to improve Delta water quality through dilution of land- and activity-derived contaminants, and ocean salinity repulsion. Implementation is at a higher level than the core actions reflect. Modify Sacramento and San Joaquin Valley as well as export area reservoir releases and groundwater storage releases in conjunction with upstream operations to accommodate system demands. Focus the timing of releases on water quality improvements while also providing (to a lesser degree of emphasis) instream aquatic habitat benefits such as improved temperature levels and optimal flows.

Reduction in Diversion Effects— Diversion effects would be lessened by core-level implementation of actions such as use of real-time monitoring and adaptive management, installation of fish screens upstream of and in the Delta, enforcement of screening requirements, and improved operation of salvage and hauling and release procedures.

Modify Clifton Court Forebay Operation— Modify operations of Clifton Court Forebay so that it does not entrain as many fish into the forebay during typical operation. Install regulating gates into Italian Slough so that water can be drawn in over time at a lower velocity. This will reduce the number of fish lost to predation in the forebay.

Management of Fisheries Production and Take— Core-level implementation of actions including improved hatchery operations, reduced hatchery effects on wild fish populations, improved regulation of recreational and commercial take, and improved enforcement of harvest regulations would be part of this alternative. Fish produced in hatcheries would be marked to facilitate selective catch of hatchery fish by commercial and recreational fisheries.

Manage Pollutant Flows— Utilize wetlands or holding ponds to store agricultural drainage for release during periods of higher instream flows. Look for opportunities, such as Colusa drains, to reuse drainage water on selected crops. With the implementation of source control and possibly added treatment, the drainage water may be applied to additional types of crops.

Acoustic Barrier at Mouth of Georgiana Slough— Operate an acoustic barrier at the mouth of Georgiana Slough for anadromous fish. Work to improve the effectiveness of behavioral barriers. Evaluate use of acoustic barriers at the Delta Cross Channel and 3-Mile Slough.

Mark Hatchery Fish— Mark salmon produced in hatcheries to facilitate selective catch by commercial and recreation fisheries to increase natural (wild) populations.

Pen Rearing of Striped Bass— Rear striped bass in pens to maintain recreational fishery and avoid operational constraints on water projects due to spawning bass.

Institutional and Policy Features

Subsidence Reduction— Efforts to reduce the subsidence on Delta islands with deep peat soils (such as parts of Grand, Twitchell, Sherman, Andrus, and Bouldin islands) will include the establishment of a landside buffer zone between 25 and 50 yards in width, located adjacent to the levee.

Emergency Levee Management Plan— An emergency levee management plan would provide necessary funding and direction to reclaim Delta islands in the event of inundation to continue protection of Delta functions as an integrated resource system. Funding would be provided to ensure that a suitable amount of equipment and materials would be readily available to rapidly respond to flood fights.

Improved Pollutant Source Controls— Existing source control regulations for pollutants may not be sufficiently comprehensive nor enforced to levels required to protect beneficial uses in the Bay-Delta system and tributary rivers. These actions would provide for increased source reduction activities such as additional regulation of agricultural and urban drainage, establishing BMP's for activities affecting Delta water quality such as levee maintenance and pest control practices, and supporting and enhancing existing land retirement and fallowing programs. Using a watershed management approach, identify and control high priority pollutant sources through a combination of source reduction and treatment actions.

Intense application of core level actions such as implementing source control regulations for pollutants, levee maintenance best management practices to encourage use of materials compatible with good water quality, retirement of lands with serious drainage disposal problems, retirement or fallowing agricultural lands with salt or other contaminant drainage problems to reduce land-derived salt contamination, management of irrigation tailwater, and retention and management of stormwater runoff would improve water quality management.

Implement on-site mine drainage remediation measures. Provide regulatory incentives and develop institutional agreements to enable focusing resources on priority sources. Through changes in water pollution requirements, give urban areas flexibility to fund high-priority mine cleanup in lieu of increasing expenditures on treatment plant improvements.

Reduce Water Demand on Delta and Increase In-Stream Flows— Use a variety of actions involving increased agricultural, municipal, and industrial conservation and reclamation; acquisition of supplemental water; and expanded use of desalination with the intent of reallocating the additional water supplies for use as instream dilution flows. Conservation strategies would include encouraging land fallowing and water pricing measures. The conserved supplies would then be available to provide water quality protection through dilution and habitat improvements such as improved temperature and pulse flows during critical migration periods.

Water Transfers and Conjunctive Use— The key actions included in this alternative improve water supply predictability. Additionally, core-level implementation of actions including improved procedures for transfer permitting, particularly during drought years, coordinating diversion and conveyance of transfers, conducting integrated resources planning, establishing long-term guarantees for water management,

coordination of groundwater/surface water management, and coordination of land use actions with water supply needs would enhance predictability during critical periods.

Obtain Environmental Water— Obtain about 100,000 acre feet from San Joaquin water users to reduce conflicts between fisheries and diversions. Water could be used to provide pulse flows to move Delta smelt downstream, away from diversion points. Another use might be dilution of poor quality San Joaquin River flows, providing benefits for fisheries, water supply, and water quality. New south-of-Delta storage would allow this water to be used as exchange water so that Delta diversions could be reduced at critical times to protect fisheries without affecting export supplies.

Sacramento River Habitat Restoration— Restore riparian, shaded riverine, and shallow water habitat along the Sacramento River from Sacramento to Collinsville. First step will be to provide matching funds for Corps of Engineers feasibility study. Subsequent restoration would be funded 75% by COE.

Response Program for Introduced Species Control— Establish and fund a rapid response program among environmental agencies to provide a fast and effective means of managing non-native species introduced to the Bay-Delta. Carry out continuing management programs for nuisance species such as water hyacinth.

Preliminary Assessment

Benefits

Ecosystem Quality— Delta levee, Delta, San Joaquin river, Bay, and channel island habitat restoration actions improve overall ecosystem quality. Management actions included in this alternative result in an overall increase in potential to manage upstream reservoir storage/outflow, upstream and in-Delta habitat, and diversions to enhance ecosystem quality. In addition, entrainment impacts would be reduced.

Water Supply— Water supply and reliability are increased through development of additional storage. Environmental water purchases and the reoperation of existing upstream reservoirs improve operational flexibility.

Water Quality— Significant water quality benefits should be realized from this alternative through combined pollutant source management and in-Delta flow management. Stabilization of levees and channels reduces the risk of a catastrophic event causing degradation of water quality (e.g. island inundation has the potential to increase salinity levels at diversion locations).

System Reliability— System reliability would be increased through implementation of levee enhancement measures above the core-level.

Constraints and Concerns

Pollutant Source Control Enforcement— Enforcement of pollutant source control regulations may be difficult to implement.

Effects of Bioaccumulation— The use of wetlands to store pollutant flows could increase wildlife contaminant concentrations through bioaccumulation.

Export Pumping Restriction— Water supply benefits depend heavily on the improvement of fish production in order to reduce the effect, of ESA restrictions.

Fish Mortality— Fish mortality in south delta export facilities remains high.

System Vulnerability— Some Delta islands remain highly vulnerable to flooding and catastrophic failure.